

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: The word "ebulated" is misspelled (see page 1, line 28).

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 9, 11, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Savin et al (US 4,060,127).

Regarding claim 1, Savin et al discloses a removable heat transfer module (bundle of tubes) having first and second ends, for use in a reactor for carrying out an exothermic reaction, the heat transfer tubes comprising a heat transfer feed tube (2); a distribution chamber; a plurality of circulation tubes (5); and a collection chamber (8, 9); said heat transfer feed tube (2) having at its first end an inlet (2) for charging the heat transfer module with heat transfer fluid, and communicating with said distribution chamber at its second end; each of said circulation tubes communicating with the distribution chamber through a first end and communicating with said collection chamber through a second end; the collection chamber having an outlet (14) for discharging coolant; wherein the inlet and the outlet are both located towards the same

end of the heat transfer module, wherein the inlet is adapted to be removably connectable to a charge pipe and the outlet is adapted to be removably connectable to a discharge pipe (see column 2, line 56 through column 4, line 26 and figure 1), where it is interpreted that hollow tube (2) is the inlet, heat transfer feed tube, and distribution chamber and where it is disclosed that the heat exchanger is designed to make it possible to remove and replace only that section to which is ruptured tube belongs.

Savin et al does not explicitly disclose coolant module but Savin et al discloses heat-consuming agent that flows through heat transfer tube (5) which are bundled together such that the heat-consuming agent acts as a coolant and the heat transfer tube bundle is a coolant module.

Claims 2-3 depend on claim 1 such that the reasoning used to reject claim 1 will be used to reject the dependent portions of the claims.

Regarding claim 2, Savin et al discloses wherein the second end of the heat transfer feed tube forms the distribution chamber with the circulation tubes connected thereto (see figure 1).

Regarding claim 3, Savin et al discloses wherein the coolant feed tube is located substantially centrally with respect to the circulation tubes (see figure 1).

Claim 4 depends on claim 3 such that the reasoning used to reject claim 3 will be used to reject the dependent portions of the claims.

Regarding claim 4, Savin et al discloses wherein the coolant feed tube protrudes through the collection chamber (see figure 1).

Regarding claim 9, Savin et al discloses a reactor for carrying out an exothermic reaction (see column 2, lines 56-62 and column 3, lines 20-45) which disclose a cylindrical shell (1) where a heating agent is supplied and the heat is transfer to the heat-consuming agent that travels through the heat transfer tubes (5) such that a reaction is taking place within the cylindrical tube (1), said reactor comprising a reactor shell (1); an inlet (12) for introducing reactants into the reactor shell; an outlet (13) for removing products from the reactor shell; and at least one removable heat transfer module having first and second ends, for use in a reactor for carrying out an exothermic reaction, the heat transfer module comprising a heat transfer feed tube; a distribution chamber; a plurality of circulation tubes (5); and a collection chamber (8, 9); said heat transfer feed tube having at its first end an inlet (2) for charging the heat transfer module with heat-consuming, and communicating with said distribution chamber at its second end; each of said circulation tubes communicating with the distribution chamber through a first end and communicating with said collection chamber through a second end; the collection chamber having an outlet (14) for discharging heat-consuming agent; wherein the inlet and the outlet are both located towards the same end of the heat transfer module (see column 2, line 56 through column 4, line 26 and figure 1), where it is interpreted that hollow tube (2) is the inlet, heat transfer feed tube, and distribution chamber and where it is disclosed the heat exchanger is designed to make it possible to remove and replace only that section to which is ruptured tube belongs.

Savin et al does not explicitly disclose coolant module but Savin et al discloses heat-consuming agent that flows through heat transfer tube (5) which are bundled

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together such that the heat-consuming agent acts as a coolant and the heat transfer tube bundle is a coolant module.

Claims 11 and 13 depend on claim 9 such that the reasoning used to reject claim 9 will be used to reject the dependent portions of the claims.

Regarding claim 11, Savin et al discloses a reactor, in which the heat-consuming feed tube (2) protrudes through the collection chamber (8, 9) (see figure 1).

Regarding claim 13, Savin et al discloses a reactor wherein the reactor shell (1) comprises an access for accessing the heat-consuming agent module (see column 4, lines 21-25), which discloses the heat transfer tube bundles may be accessed to remove and replace damaged tube bundles.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 5-8, 12, and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Savin et al (US 4,060,127).

Claims 5-8 depend on claim 1 such that the reasoning used to reject claim 1 will be used to reject the dependent portions of the claims.

Regarding claim 5, Savin et al discloses a bundle of circulation tubes (see column 3, lines 12-19).

Savin et al does not disclose the heat transfer tube bundle comprising between about 20 and about 4,000 circulation tubes.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the heat transfer tube bundle comprising between about 20 and about 4,000 circulation tubes, since it has been held the where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (see MPEP 2144.05).

Regarding claim 6, Savin et al discloses a bundle of circulation tubes (see column 3, lines 12-19).

Savin et al does not disclose the heat transfer tube bundle wherein each of the tubes has a length of about 4 to about 40 meters.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the length of the tubes are about 4 to about 40 meters, since it has been held the where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (see MPEP 2144.05).

Regarding claim 7, Savin et al discloses a bundle of circulation tubes (see column 3, lines 12-19).

Savin et al does not disclose the heat transfer tube bundle wherein the diameter of each circulation tube is from about 1 to about 10 cm.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the diameter of each circulation tube is from about 1 to about 10 cm, since it has been held the where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (see MPEP 2144.05).

Regarding claim 8, Savin et al does not disclose a heat transfer module (bundle of tubes) having a square, triangular, rectangular, trapezoidal or hexagonal cross section.

It would have been an obvious matter of design choice to have a heat transfer module (bundle of tubes) having a square, triangular, rectangular, trapezoidal or hexagonal cross section, since applicant has not disclosed that a heat transfer module (bundle of tubes) having a square, triangular, rectangular, trapezoidal or hexagonal cross section solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with a heat transfer module (bundle of tubes) having a square, triangular, rectangular, trapezoidal or hexagonal cross section.

Claims 12 and 16 depend on claim 9 such that the reasoning used to reject claim 9 will be used to reject the dependent portions of the claims.

Regarding claim 12, Savin et al discloses a bundle of circulation tubes (see column 3, lines 12-19).

Savin et al does not disclose the heat transfer tube bundle comprising between about 4 and about 100 circulation tubes.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the heat transfer tube bundle comprising between about 4 and about 100 circulation tubes, since it has been held the where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (see MPEP 2144.05).

Regarding claim 16, Savin et al does not disclose a reactor wherein the outlet comprises a filter.

Filters are known in the art.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have reactor with a filter, since it was known in the art that filters are used to purify a fluid (see MPEP 2144.03 (A-E)).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a filter at the outlet of the reactor, since it has been held that rearranging parts of an invention involves only routine skill in the art (see MPEP 2144.04 (VI-C)).

Regarding claim 17, Savin et al does not disclose a method for carrying out an exothermic reaction comprising the steps of: charging a reactor with reactants; cooling the contents of the reactor and removing products from the reactor, wherein cooling is carried out using at least one cooling module comprising a coolant feed tube; a distribution chamber; a plurality of circulation tubes; and a collection chamber; said coolant feed tube having at its first end an inlet, for charging the cooling module with coolant, and communicating with said distribution chamber at its second end; each of said circulation tubes communicating with the distribution chamber through a first end and communicating with said collection chamber through a second end; the collection chamber having an outlet for discharging coolant; wherein the inlet and the outlet are both located towards the same end of the cooling module, wherein the inlet is adapted to be removably connectable to a charge pipe and the outlet is adapted to be removably connectable to a discharge pipe.

However, Savin et al discloses an apparatus capable of carrying out the method such that claim 17 is rejected using the same reasoning used to reject claim 9.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Savin et al (US 4,060,127) as applied to claim 9 above, and further in view of applicant's admitted prior art.

Claim 10 depends on claim 9 such that the reasoning used to reject claim 9 will be used to reject the dependent portions of the claim.

Regarding claim 10, Savin et al does not disclose a reactor wherein the inlet is adapted to be removably connectable to a charge pipe and the outlet is adapted to be removably connectable to a discharge pipe.

Applicant admits that the removably connectable means to be used comprises means in the art, see for instance Perry's Chemical Engineers' Handbook, 6th Edition, Chapter 6, 6-41/6-57 and suitable means are flanges, threaded joints (using single or double threaded connection joints), clamp joints, seal ring joints, pressure seal joints, compression fitting joints etc (see page 6, lines 26-33).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Savin et al with the applicant's admitted prior art such that the inlet is adapted to be removably connectable to a charge pipe and the outlet is adapted to be removably connectable to a discharge pipe for the predictable result of easy removable of parts.

Claims 14-15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Savin et al (US 4,060,127) as applied to claims 9 and 17 above, and further in view of GB 787,123.

Claims 14-15 depend on claim 9 such that the reasoning used to reject claim 9 will be used to reject the dependent portions of the claims.

Regarding claim 14, Savin et al does not disclose a reactor further comprising a support for supporting the cooling module.

GB 787,123 discloses a bundle of tubes (27) supported by support member (31) (see page 4, line 103 through page 5, line 26).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Savin et al with the teachings of GB 787,123 for the predictable result of extra support.

Regarding claim 15, Savin et al does not disclose a reactor wherein the inlet comprises a sparger.

GB 787,123 discloses a reactor with a sparger (41, 42) (see page 5, lines 61-85).

The combination of the prior art elements of a reactor with a removable cooling module and a sparger would have yielded the predictable result of even distribution of fluid into the reactor.

Claim 18 depends on claim 17 such that the reasoning used to reject claim 17 will be used to reject the dependent portions of the claim.

Regarding claim 18, Savin et al does not disclose a process for the synthesis of hydrocarbons wherein the reactor is charged with syngas.

However, Savin et al discloses an apparatus capable of carrying out the method such that claim 18 is rejected using the same reasoning used to reject claim 15.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATASHA YOUNG whose telephone number is (571)270-3163. The examiner can normally be reached on Mon-Thurs 7:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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